2

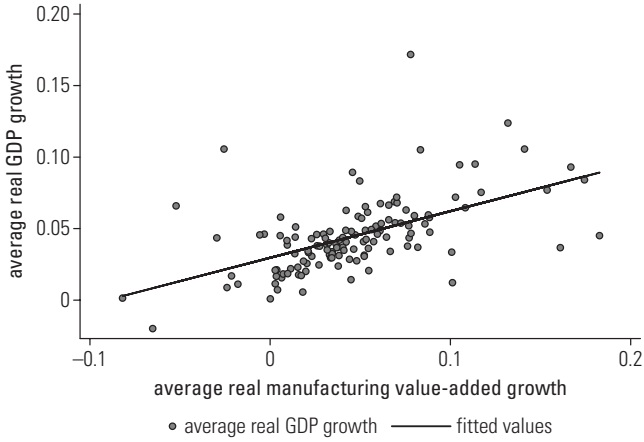
Development Experience of China and India

Two stylized facts of significance emerge from the experience of fast-growing Asian economies and of other developing economies. First, rapid growth of GDP is correlated with the expansion of manufacturing industry. Figure 2.1 shows the relationship between average real growth in manufacturing value added and real growth in GDP for developing countries between 1995 and 2005. The data come from World Development Indicators, maintained by the World Bank. The trend line represents a simple bivariate regression.[1] From the figure, it is apparent that the slope is positive. While causality is hard to establish, the result suggests that one percentage point increase in manufacturing value added growth is associated with 0.33 percentage point increase in GDP growth.

Second, each of the high-achieving Asian economies relied on exports of manufactures generated by the development of competitive industries—which were quick to exploit international market opportunities. Manufactured goods composed as much as 90 percent of the exports of the Philippines during 1996–2006 and about 50 percent of the exports of Indonesia and Vietnam. The other countries ranged in between, with the East Asian economies clustered near the upper end (Asian Development Bank 2009). Net exports contributed between 10 percent and almost 50 percent of the growth of the East Asian economies. Korea, Indonesia, Malaysia, the Philippines, and Thailand derived more impetus from net exports during 1995–2000. Hong Kong, China; Taiwan, China; Singapore; and Japan drew more of their growth from exports during 2000–06 (See figure 2.2, Haltmaier and others 2007, and Prasad 2009). However,

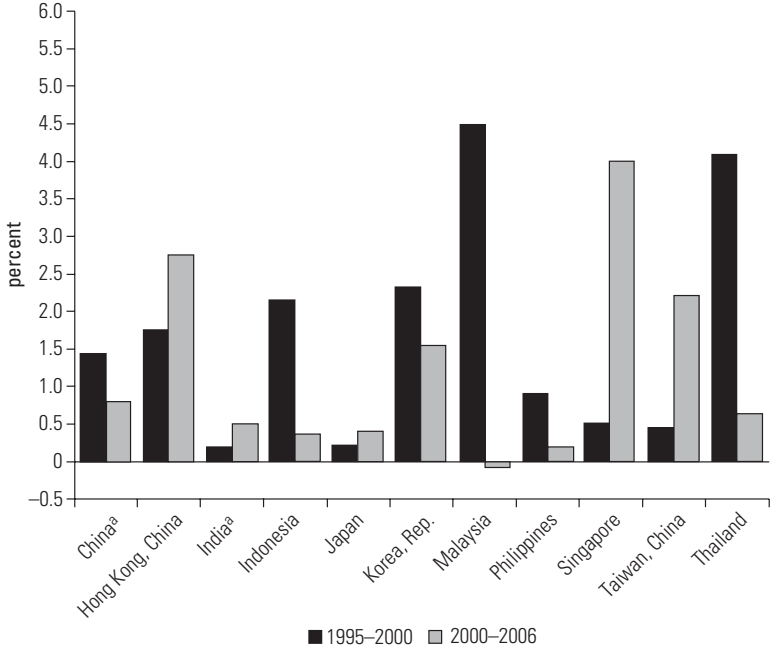
[1]The regression result is $y = 0.029556 + 0.3259912x$. Adjusted R-square was 0.2987. The t-value associated with the coefficient estimate was 7.39.

Figure 2.1 Relationship between GDP Growth and Growth in Manufacturing Value Added



Source: Authors' calculations using World Development Indicators Database.

Figure 2.2 Percentage Point Contribution of Real Net Exports to GDP Growth in Asia



Source: Haltmaier and others 2007.
a. China and India data are through 2005.

irrespective of contribution of net exports, export growth in the aggregate and tradable sectors was the principal source of technological and entrepreneurial dynamism in these economies.[2]

China's Industrial Development

China is a manufacturing economy par excellence, and the genesis of this sectoral dominance can be traced to the consistent preference for manufacturing as a growth driver. This began in the 1950s; in the earlier decades, the government pursued an autarchic development strategy on ideological grounds, and this strategy targeted heavy industries such as ferrous metals and machinery. Consumer goods had a relatively small share of the total. The U.S. embargo on trade with China and the virtual cessation of trading links with the former Soviet Union provided added inducement for China to build a broad domestic industrial base using whatever technologies were within its reach. By the 1960s, more than a third of China's GDP originated in the industrial sector. This rose to 45 percent by the end of the 1970s.[3] The reforms that blended elements of the market economy into Chinese socialism did nothing to dilute the significance assigned to manufacturing; however, the government began altering the composition of the manufacturing sector. This process continues as China's policy makers revise their objectives and raise their sights every few years.

The opening of China's economy stimulated the development of manufacturing activities with export potential and increased the salience of light manufactures—including consumer electronics, textiles, apparel, toys, footwear, furniture, and leather goods—in which China enjoyed a comparative advantage, given the abundance of labor relative to capital.[4] The transfer of facilities for producing such goods from Hong Kong to special economic zones (SEZs) and cities in the Pearl River Delta contributed to this compositional shift.

By adopting a more decentralized approach to development, reinforced by fiscal and other incentives encouraging localized entrepreneurship (both private and quasi-public), the central government further encouraged the diversification of industry. The early 1980s saw the start of a boom in township and village enterprises (TVEs) producing a wide range of consumer goods, agricultural implements and machinery, pulp and paper, chemicals, metal products, and other

[2]Imports have been no less important in transferring technology and as a source of competition. As Ding and Knight (2008) show, the contribution of imports to China's growth rivals that of exports.

[3]A deliberate relocation of industry and skilled workers from coastal cities to inland areas starting in the mid-1960s and extending through the mid 1970s misallocated resources and caused hardship. However, it did transfer technology to the interior of China.

[4]On the aligning of production with comparative advantage, see Lin (2009).

goods.[5] The TVEs were mostly small enterprises serving local markets as these took root, but by the latter part of the 1980s TVEs had become a major source of light manufactures for export. In fact, 21 percent of China's total exports in 1991 were by TVEs (Perotti, Sun, and Zou 1999). Thus, policies promoting manufacturing for export—fueled by foreign direct investment (FDI) and reforms that permitted TVEs to flourish—began widening the domestic market for a variety of manufactured goods.

Starting in the mid-1990s, China began diversifying into the assembly of higher-tech electronic products, machinery, and office equipment. This was paralleled by the targeting of the auto and other heavy industries as pillars of China's economy, an action that also galvanized the petrochemical sector. Over the last decade, these three subsectors have become the foremost drivers of industry.

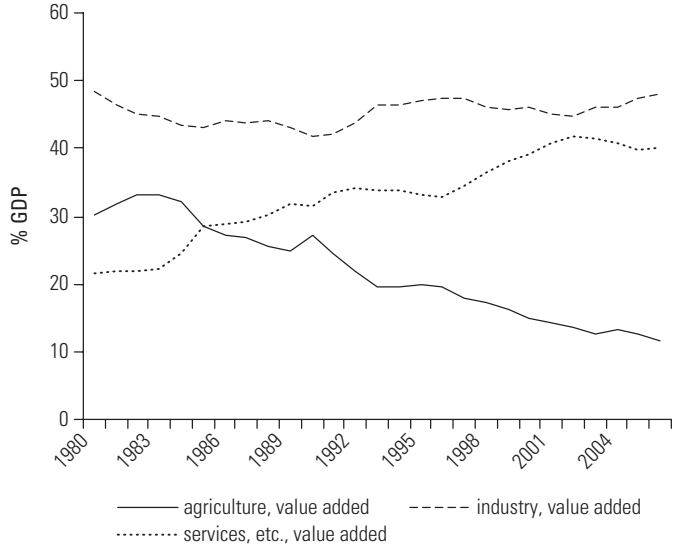
Strengthening industrial capabilities and increasing evidence of competitiveness encouraged policy makers to begin building China's national innovation system to induce the design, development, and production of more sophisticated products. The objective is to move the economy decisively beyond assembly to activities with higher added value and potentially greater profitability. This process, which began gathering momentum in the late 1990s, is continuing, with Chinese firms and universities sinking more money into R&D to stimulate product and process innovation.

Tracking the sectoral and subsectoral developments in industrial production over almost three decades reveals both the speed of industrial growth and the compositional changes that have contributed to it. Figure 2.3 indicates that as of 1980, a little less than half of China's GDP originated in the industrial sector, while 30 percent was from agriculture. By the mid-1980s, agriculture was losing ground, being displaced by services; the two curves form a virtual mirror image, with agriculture's share shrinking as the share of services shoots upward. Industry, however, has more or less maintained its position, ending in 2006 close to where it started (table 2.1). By 2008, agriculture's share dropped below 10 percent, industry's share stood at 48 percent, and that of services was at about 42 percent.

When the output of manufacturing as a whole is broken down into its constituent parts, another kind of transition is apparent. In 1980, about 40 percent of production was composed of light manufactures, with food products and textiles being the two largest (see figure 2.4). The balance of industrial output originated in subsectors producing intermediate products and machinery and equipment. Ten years later, the share of textiles, apparel, and food products was

[5]TVEs had their roots in the rural industrialization efforts that commenced in the early 1970s. See Womack and Jones (1994). There is a sizable literature on the genesis of TVEs, the ownership structure of these entities, and the role of local governments. See, for example, Findlay, Watson, and Wu (1994); Pei (1996); Chen (1998); Chen and Rozelle (1999); Oi (1999); and Khanna (2007), who uses the example of the company TCL to illustrate how TVEs provided a springboard for the growth of larger firms.

Figure 2.3 Composition of GDP (Supply Side), China



Source: World Development Indicators Database.

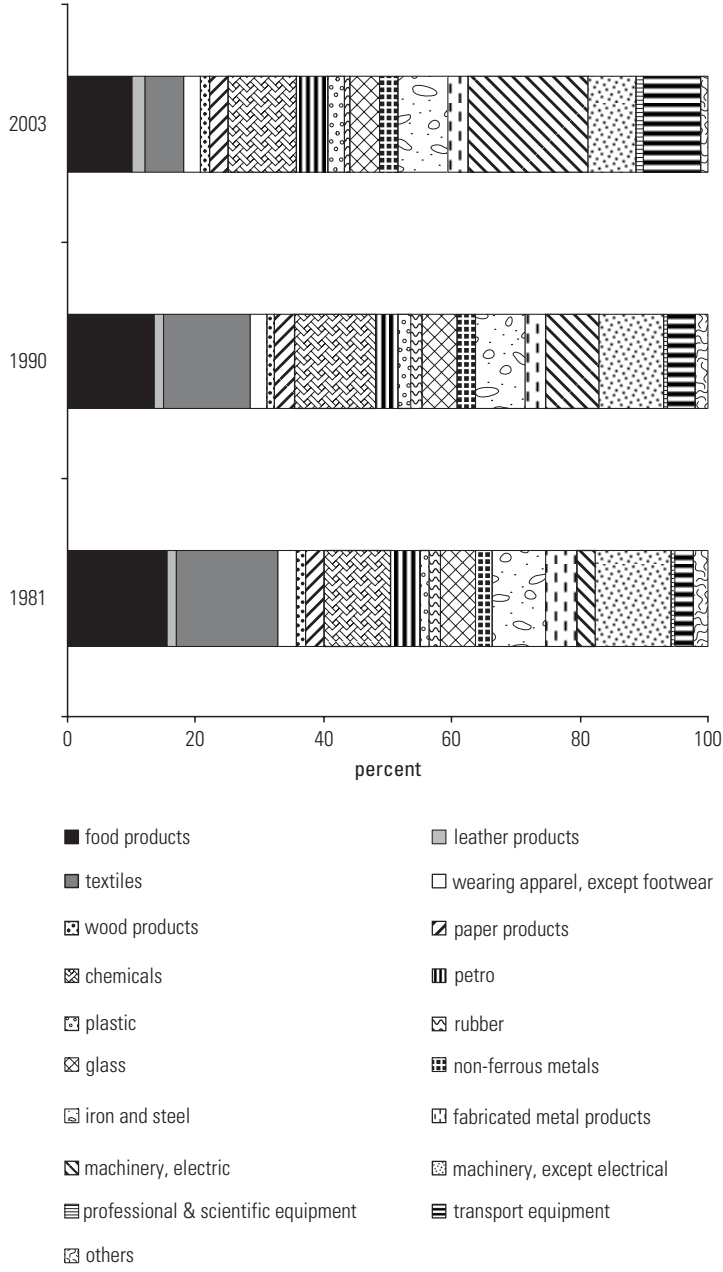
Table 2.1 Composition of GDP (Supply Side), China
share of GDP (%)

Series	1980	1985	1990	1995	2000	2006
Industry, value added	48.5	43.1	41.6	47.2	45.9	48.1
Services, etc., value added	21.4	28.5	31.3	33.1	39.3	40.2
Agriculture, value added	30.1	28.4	27.0	19.8	14.8	11.7

Source: World Development Indicators Database.

in decline, whereas that of industrial intermediates such as chemicals, glass, and rubber products was expanding. This tendency had become more pronounced by 2003, by which time textiles, apparel, foodstuffs, and leather products accounted for just one-fifth of output. The biggest gainer over this entire period was electronics (including electrical machinery), followed by transport equipment. Four years later, the scale of the electronics sector, broadly defined, is even more prominent—as is that of transport equipment and allied industries such as ferrous metals, petroleum, coking, and chemicals. Together these four subsectors were responsible for 22.2 percent of the value of manufacturing output in 2007. If we add to these the production of machinery and other metal products, the total swells to 43.2 percent of aggregate manufacturing output (see table 2.2).

Figure 2.4 Industrial Composition by Type of Manufactures of China, 1981, 1990, and 2003



Source: UNIDO INDSTAT3.

Table 2.2 Industrial Composition of China, 2007

Sector	Gross industrial output Value (100 million yuan)	Composition (%)
National total	352,950.1	
Processing of food from agricultural products	17,496.1	5.0
Manufacture of foods	6,071.0	1.7
Manufacture of beverages	5,082.3	1.4
Manufacture of tobacco	3,776.2	1.1
Manufacture of textiles	18,733.3	5.3
Manufacture of textile apparel, footwear, and caps	7,600.4	2.2
Manufacture of leather, fur, feather, and related products	5,153.5	1.5
Processing of timber; manufacture of wood, bamboo, rattan, palm, and straw products	3,520.5	1.0
Manufacture of furniture	2,424.9	0.7
Manufacture of paper and paper products	6,325.5	1.8
Printing, reproduction of recording media	2,117.6	0.6
Manufacture of articles for culture, education, and sports activities	2,098.8	0.6
Processing of petroleum, coking, processing of nuclear fuel, and manufacture of raw chemical materials and products	44,649.7	12.7
Manufacture of medicines	6,361.9	1.8
Manufacture of chemical fibers	4,120.8	1.2
Manufacture of rubber	,462.4	1.0
Manufacture of plastics	8,120.4	2.3
Manufacture of nonmetallic mineral products and metal products; and smelting and pressing of non-ferrous metals	45,038.4	12.8
Smelting and pressing of ferrous metals	33,703.0	9.5
Manufacture of general and special-purpose machinery	29,007.5	8.2
Manufacture of transport equipment	27,147.4	7.7
Manufacture of electrical machinery and equipment	67,550.8	19.1
Manufacture of artwork and other manufacturing	3,387.7	1.0

Source: National Statistical Bureau of China 2008.
Note: Mining; recycling of disposal waste and production; and supply of power, gas, and water are excluded from the national total. The composition is thus focused solely on manufactures.

Over the 26-year period from 1980 to 2006, industry was consistently the principal source of growth, followed by services, with agriculture falling behind as its growth slowed and its share diminished (see table 2.3). Meanwhile, services have pulled abreast of industry; their contribution is on the rise across the spectrum. This trend is likely to persist, with services pulling ahead, as in other middle- and

Table 2.3 Average Shares of Contribution to Growth, China
percent

	Consumption	Government spending	Investment	Net exports
1970s	39.0	16.7	50.7	–6.5
1980s	50.3	14.6	32.8	2.4
1990s	34.3	17.3	34.3	14.0
2000s	31.2	13.8	47.6	7.4

Source: World Development Indicators Database.

high-income economies (McKinsey Global Institute 2010). This might happen soon, if international trade grows more slowly.

A partitioning of the sources of growth in China indicates how sectoral change came about. Bosworth and Collins (2007) estimate that physical capital and total factor productivity contributed 3.2 percent and 3.8 percent, respectively, to China's GDP growth between 1978 and 2004.[6] During 1993–2004, their contributions were 4.2 percent and 4.0 percent, respectively (see table 2.4). Within this context, the role of industry overshadows the other sectors. As table 2.5 shows, capital and TFP respectively contributed 2.2 percent and 4.4 percent of growth during 1978–2004, and 3.2 percent and 6.2 percent from 1993–2004.[7] Although industry-specific data are lacking, empirical evidence from other countries suggests that TFP has risen much faster in the electrical and nonelectrical machinery subsectors (Jorgenson, Ho, and Stiroh 2007). This has added to the prominence of these industries and raised the average increase of TFP for manufacturing as a whole.

Over the same two periods, services derived 2.7 percent of its growth from capital and 1.9 percent from TFP (1978–2004). The contribution of TFP to services fell to just 0.9 percent per year between 1993 and 2004. Clearly, industry has lived up to its international reputation for productivity growth, and its future role could well influence how rapidly China's GDP continues expanding.

[6]This estimate can be compared with others by He and Kuijs (2007). The sources of growth in China are estimated by, among others, Wang and Yao (2003); Badunenko, Henderson, and Zelenyuk (2008); and Urel and Zebregs (2009). All of them find that capital played the leading role. According to some estimates, China's TFP growth during 1990–2008 was even higher—almost 4 percent—reflecting not just the effects of labor transfer to the urban industrial sector but also China's extraordinary success at absorbing technology and catching up ("Secret Sauce" 2009). On the research dealing with productivity see Syverson (2010).

[7]A more recent estimate by Kuijs (2010) pegs the contribution of TFP during 1995–2009 at 2.7 percent and the contribution of capital at 5.5 percent.

Table 2.4 Sources of Growth: China, India, and East Asia, 1978–2004
annual rate of change (%)

Period		Output	Employment	Output per worker	Contribution of: Physical capital	Land	Education	Factor productivity
Total economy								
1978–2004	China	9.3	2.0	7.3	3.2	0.0	0.2	3.8
	India	**5.4**	**2.0**	**3.3**	**1.3**	**0.0**	**0.4**	**1.6**
1993–2004	China	9.7	1.2	8.5	4.2	0.0	0.2	4.0
	India	**6.5**	**1.9**	**4.6**	**1.8**	**0.0**	**0.4**	**2.3**
East Asia excluding China								
1960–80		7.0	3.0	4.0	2.2	—	0.5	1.2
1980–2003		6.1	2.4	3.7	2.2	—	0.5	0.9
1980–93		7.3	2.7	4.6	2.6	—	0.6	1.4
1993–2003		4.5	2.0	2.5	1.8	—	0.5	0.3

Source: Bosworth and Collins 2007.
Note: — = not available.

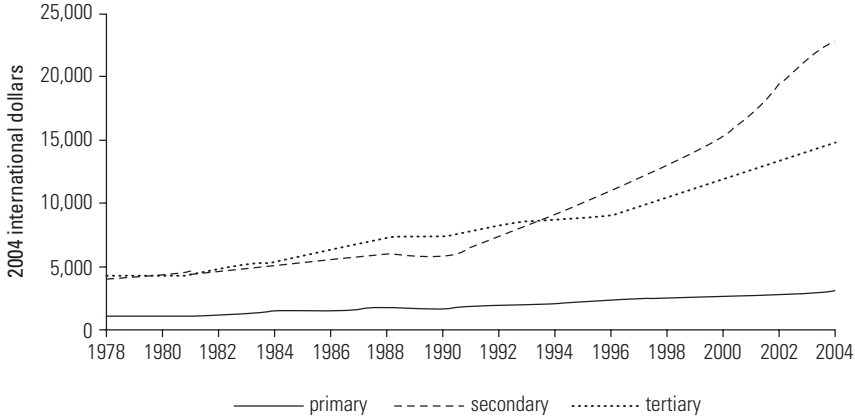
Table 2.5 Sources of Growth by Major Sector, 1978–2004
annual rate of change (%)

Period		Output	Employment	Output per worker	Contribution of: Physical capital	Land	Education	Factor productivity
Industry								
1978–2004	China	10.0	3.1	7.0	2.2	—	0.2	4.4
	India	**5.9**	**3.4**	**2.5**	**1.5**	**—**	**0.3**	**0.6**
1993–2004	China	11.0	1.2	9.8	3.2	—	0.2	6.2
	India	**6.7**	**3.6**	**3.1**	**1.7**	**—**	**0.3**	**1.1**
Services								
1978–2004	China	10.7	5.8	4.9	2.7	—	0.2	1.9
	India	**7.2**	**3.8**	**3.5**	**0.6**	**—**	**0.4**	**2.4**
1993–2004	China	9.8	4.7	5.1	3.9	—	0.2	0.9
	India	**9.1**	**3.7**	**5.4**	**1.1**	**—**	**0.4**	**3.9**

Source: Bosworth and Collins 2007.
Note: — = not available.

The productivity advantage of the industrial sector in China is underscored by the trend increase in the value of output per worker. Figure 2.5 indicates that output per worker in industry equaled that in services through 1984, then briefly dropped below services, and then began decisively pulling ahead after 1994. Value added per worker has consistently been higher in industry as a share of total value

Figure 2.5 Output per Worker by Sector, China, 1978–2004



Source: Bosworth and Collins 2007.

added (see table 2.6). In 1978, value added by services was about half that of industry. By 1993 the gap had narrowed, with services accounting for a third of industry's share. As of 2004, the share of services was unchanged; but that of industry had risen to 58 percent. Moreover, the growth of output per worker in industry doubled between 1978–93 and 1993–2004 from 2.4 percent to 5.0 percent per year. The tertiary sector's share also increased, but only from 1.1 percent to 1.7 percent (table 2.7).

The flip side of these gains in industrial productivity is declining employment. This is a worldwide and disquieting trend in manufacturing—no growth or even negative growth in jobs. China's vast manufacturing sector employed 98 million in 1995. By 2002 the number had fallen to 83 million,[8] after a decade of double-digit growth.

Three decades after the start of reform, China's share of global output and value added have swelled enormously. By 2009 China was the world's leading manufacturer of iron, steel, cement, aluminum, and glass. In Asia, China is the largest or the second largest producer (after Japan) in virtually every major product group; it overtook Korea in transport equipment in 2008, and by the end of 2009 the order volume in China's shipyards exceeded that of Korea in terms of compensated gross tonnage (54.96 million compensated gross tonnage). In textiles, garments, furniture, toys, and leather products it towers over other countries and, along with Japan, claims a large share of the market for

[8]This number is from the *China Labour Statistical Yearbook 2007.*

Table 2.6 Value Added and Employment by Industry as Share of Total
percent

		Primary	Secondary	Tertiary	Total
Value added					
1978	China	28	48	24	100
	India	**44**	**24**	**32**	**100**
1993	China	17	51	33	100
	India	**33**	**28**	**39**	**100**
2004	China	9	58	33	100
	India	**22**	**28**	**50**	**100**
Employment					
1978	China	71	17	12	100
	India	**71**	**13**	**16**	**100**
1993	China	56	22	21	100
	India	**64**	**15**	**21**	**100**
2004	China	47	23	31	100
	India	**57**	**18**	**25**	**100**

Source: Bosworth and Collins 2007

Table 2.7 Sectoral Growth in Output per Worker, 1978–2004
contribution to growth (%)

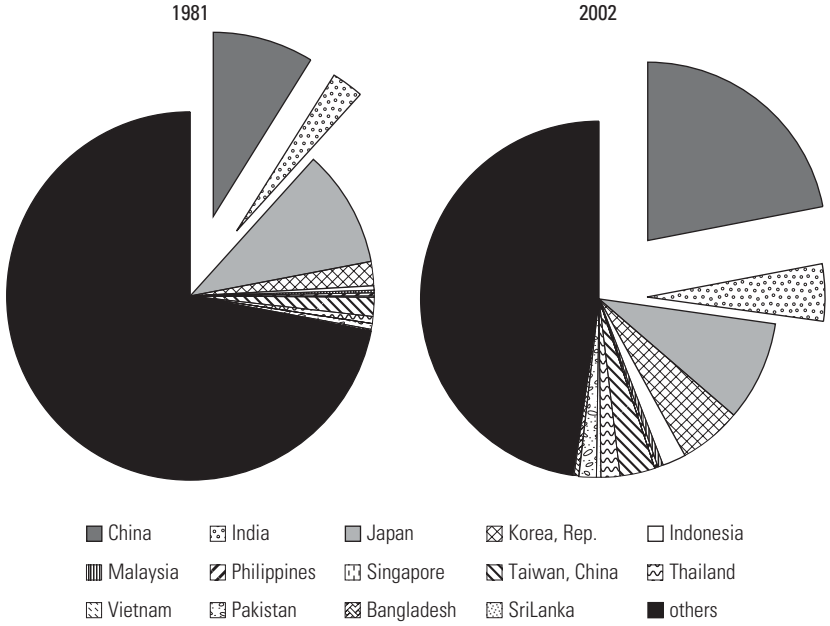
		Total	Primary	Secondary	Tertiary	Reallocation
1978–93	China	6.4	1.2	2.4	1.1	1.7
	India	**2.4**	**0.6**	**0.5**	**0.7**	**0.6**
	Difference	4.0	0.6	1.9	0.5	1.0
1993–2004	China	8.5	0.7	5.0	1.7	1.2
	India	**4.6**	**0.5**	**0.9**	**2.1**	**1.2**
	Difference	3.9	0.2	4.1	–0.4	0.0

Source: Bosworth and Collins 2007.

electronics. The contrast between China's share in the early 1980s and 20 years later is striking; it testifies to China's remarkable capability to industrialize, not just in a few areas, but across the entire range of subsectors (see figures 2.6, 2.7, 2.8, and 2.9 for shares in 1981 and 2002).

China's early commitment to industrialization—and, since 1978, its investment in and steady upgrading of its manufacturing and technological capabilities—is yielding extraordinary dividends in terms of productivity, industrial diversification,

Figure 2.6 Share in Global Output, Textiles, 1981 and 2002
percent



Source: UNIDO INDSTAT3.
Note: Data for Bangladesh are from 1981, 1990 and 1998; for Pakistan, 1981, 1990 and 1996; for the Philippines, 1981, 1990, and 1997; for Sri Lanka, 1981, 1990, and 2001; for Taiwan, China, 1981, 1990, and 1996; and for Vietnam, 2000 and 2002.

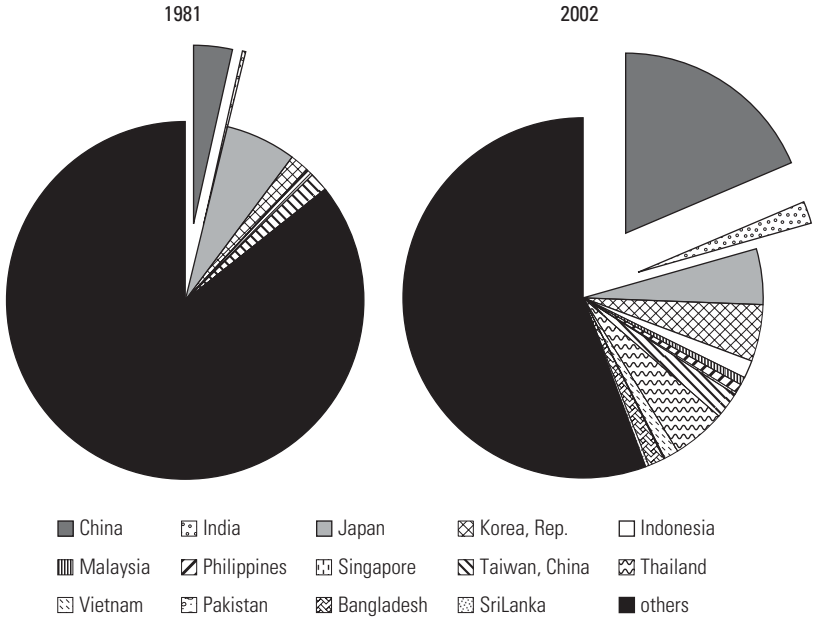
and growth.[9] Three factors have helped to ensure the success of industrialization in generating rapid growth: exports, urban development, and efforts at rapidly augmenting technological capabilities, in chronological order.

Export Composition and Growth

As noted in chapter 1, China is an unusually open economy for its size, with a high ratio of trade to GDP. It is also the most successful exporting nation on record. Aided by globalization and the international redistribution of manufacturing capacity, China's exports have risen faster than those of its closest competitors—Germany, Japan, and Korea (see table 2.8). The composition of its exports also has changed significantly. In 1985, over 60 percent of China's

[9]However, provincial resistance to the exit of marginal and inefficient producers has slowed the gains in productivity, especially in the materials processing and transport industries. It has also resulted in the accumulation of excess capacity.

Figure 2.7 Share in Global Output, Wearing Apparel (except Footwear), 1981 and 2002
percent

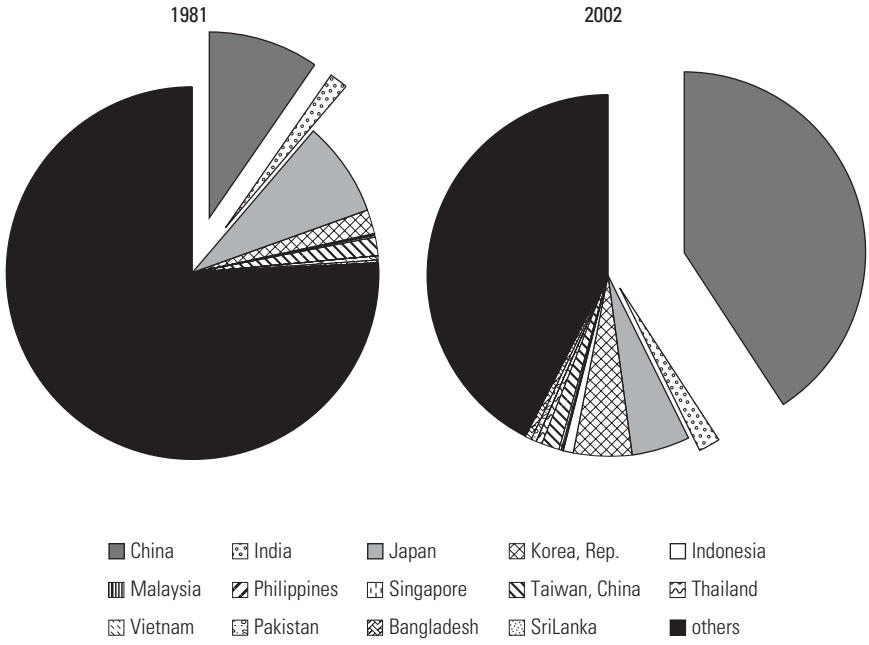


Source: UNIDO INDSTAT3.
Note: Data for Bangladesh are from 1981, 1990 and 1998; for Pakistan, 1981, 1990 and 1996; for the Philippines, 1981, 1990, and 1997; for Sri Lanka, 1981, 1990, and 2001; for Taiwan, China, 1981, 1990, and 1996; and for Vietnam, 2000 and 2002.

exports were resource- and agriculture-based products and primary products. Electronics and other high-technology products accounted for a little more than 5 percent of the total. Five years later, the share of the former product group had been cut almost by half; by 2006, it was down to 12 percent. The big gainers were exports of electronics, telecommunications products, and office equipment, the shares of which grew from 5.4 percent in 1985 to more than one-third in 2006. Underlying this remarkable performance was a technological revolution that produced a flow of new products feeding a seemingly insatiable demand worldwide. The other export categories that raised their shares were engineering products, processed exports, and automotive products.[10] Collectively, their

[10]Exports of electrical machinery and transport equipment accounted for 36 percent of Asia's exports in 1992. By 2006 their share had risen to 56 percent on average and to 70–80 percent for Malaysia, Singapore, and the Philippines (Asian Development Bank 2009).

Figure 2.8 Share in Global Output, Leather Products, 1981 and 2002
percent

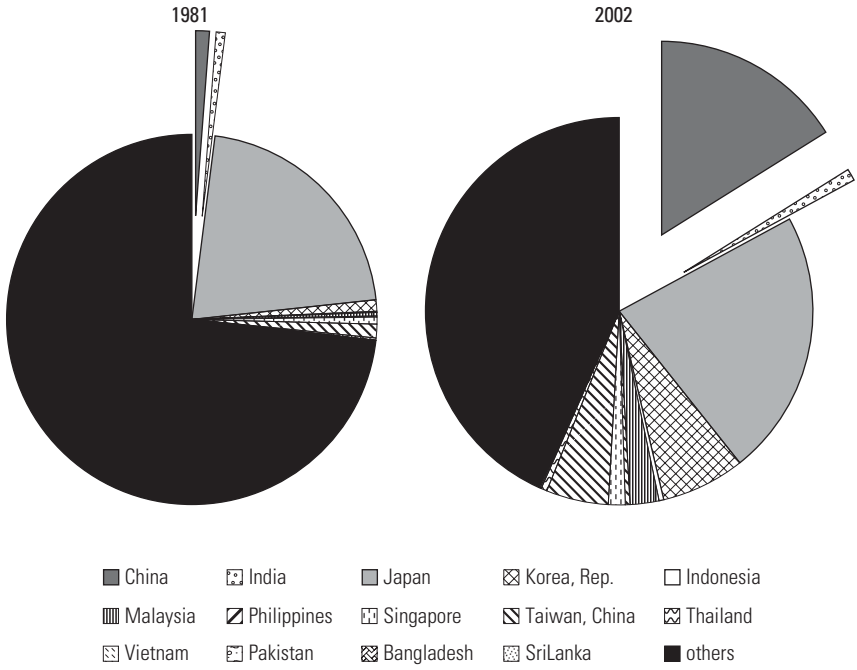


Source: UNIDO INDSTAT3.
Note: Data for Bangladesh are from 1981, 1990 and 1998; for Pakistan, 1981, 1990 and 1996; for the Philippines, 1981, 1990, and 1997; for Sri Lanka, 1981, 1990, and 2001; for Taiwan, China, 1981, 1990, and 1996; and for Vietnam, 2000 and 2002.

share rose from under 13 percent in 1985 to 22 percent in 2006. In the intervening years, the share of textiles, garments, footwear, and other light manufactures peaked at 47 percent in 1995 before settling to 32 percent in 2006 (see figure 2.10 and table 2.9).

Starting out as an exporter of primary and resource-based products in the first half of the 1980s, China recast itself as the premier producer of textiles and light manufactures from 1985 to 1995. This is a typical pattern for a late industrializer emerging from a state of industrial backwardness—but one that was developed in an amazingly short period of time. Ten years later, while maintaining its strong presence in light manufactures, China elbowed out competitors around the world to emerge as the leading exporter of electronics and high-tech products—many assembled—and among the top 10 exporters in other major product categories

Figure 2.9 Share in Global Output, Electric Machinery, 1981 and 2002
percent



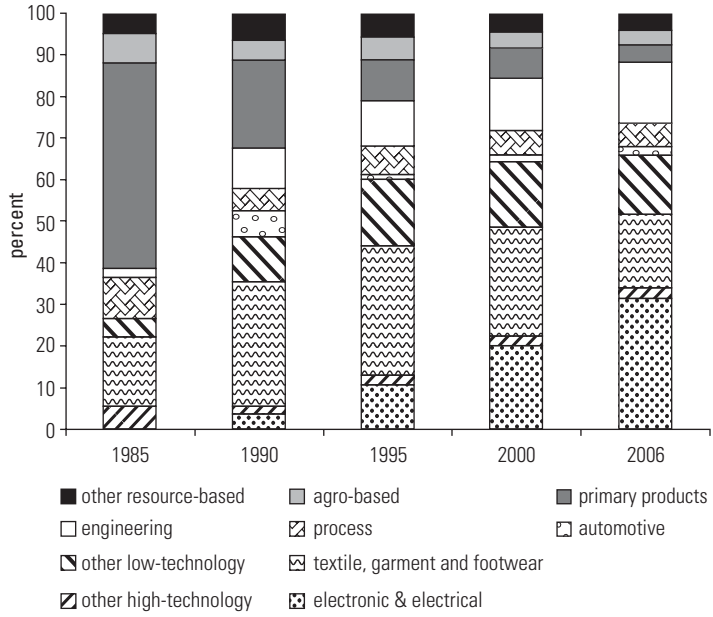
Source: UNIDO INDSTAT3.
Note: Data for Bangladesh are from 1981, 1990 and 1998; for Pakistan, 1981, 1990 and 1996; for the Philippines, 1981, 1990, and 1997; for Sri Lanka, 1981, 1990, and 2001; for Taiwan, China, 1981, 1990, and 1996; and for Vietnam, 2000 and 2002.

Table 2.8 Exports of Goods and Services
current US$ billions

Country	1980	1985	1990	1995	2000	2005	2007
China	20.2	30.5	68.0	168.0	279.6	836.9	1342.2
Japan	144.7	193.6	316.8	480.9	512.7	652.5	771.0
Korea, Rep.	20.5	30.9	73.7	149.1	208.9	334.5	442.2
Germany	186	176.6	425.2	604.3	634.2	1141.6	1549.4

Source: World Development Indicators Database.

Figure 2.10 Export Composition of China by Technology Class



Source: Authors' calculations using UN Comtrade data.

(see table 2.10). The items in which China's presence is insignificant are automotive and processed primary commodities (table 2.11), although, as discussed below, China's profile in automotive products is likely to rise.[11] Such a drastic transformation of export composition is unusual, even among East Asian economies. In the early days, Japan's exports were also dominated by low-tech products, mainly garments and textiles (see figure 2.11), but the shift toward medium- and high-tech products there was slower. In comparison, Korea completed the transition much more quickly, first through a rapid increase of

[11]China became the largest single market for automobiles in 2009, with sales of 13.6 million units, compared to 10.4 million in the United States, long the world leader (*China Daily* 2010). However, China's domestic manufacturers have thus far managed to sell practically no cars overseas, aside from a trickle in Russia, Ukraine, Eastern Europe, and Latin America. How quickly this might change and whether China is able to enter the market for battery-powered or hybrid vehicles could significantly affect the course of future industrialization and the growth of exports to Asia and other countries. Haddock and Jullens (2009) foresee a bright future for the global auto industry as demand from the BRICs (Brazil, the Russian Federation, India, and China) rises and technology evolves.

Table 2.9 China Export Composition by Technology Class
percent

Country	Year	Electronic and electrical	Other high technology	Textile, garment, and footwear	Other low technology	Automotive	Process	Engineering	Primary products	Agro-based	Other resource-based
China	1985	0.7	4.7	17.0	4.0	0.5	10.0	1.9	49.5	7.2	4.6
	1990	3.7	1.7	30.1	11.0	6.1	5.4	9.8	21.0	4.8	6.5
	1995	10.9	2.3	31.1	15.8	1.0	7.3	10.7	10.0	5.3	5.6
	2000	20.2	2.5	25.9	16.0	1.5	5.8	12.5	7.4	3.9	4.4
	2006	31.4	2.6	17.6	14.2	2.1	5.7	14.7	4.3	3.3	4.1

Source: Author's calculations using UN Comtrade data.

Table 2.10 Export Composition by Technology Class, 2006
percent

Country	Electronic and electrical	Other high technology	Textile, garment, and footwear	Other low technology	Automotive	Process	Engineering	Primary products	Agro-based	Other resource-based
China	31.4	2.6	17.6	14.2	2.1	5.7	14.7	4.3	3.3	4.1
India	2.9	4.3	17.6	12.8	3.1	9.2	7.6	15.3	3.3	23.9
Japan	19.4	4.7	0.9	7.8	22.8	8.8	26.5	1.9	2.2	5.0
Korea, Rep.	31.1	5.7	3.7	7.8	13.9	10.1	18.6	2.8	2.2	4.1

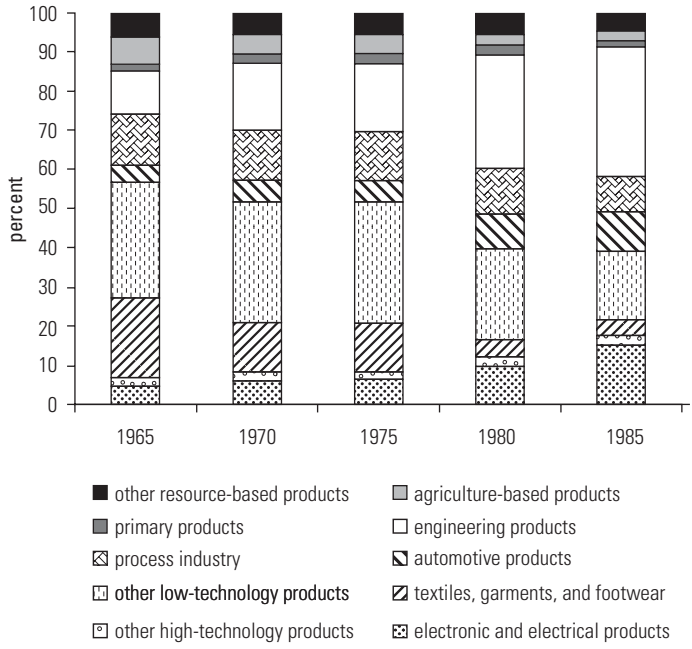
Source: Author's calculations using UN Comtrade Data.

Table 2.11 Global Rank and Share of Exports by China and India, 2006

	China		India	
Technology class	**Rank**	**Share (%)**	**Rank**	**Share (%)**
HT1	1	16.84	35	0.18
HT2	8	3.66	24	0.58
LT1	1	26.71	6	3.17
LT2	1	12.40	21	1.32
MT1	12	2.05	29	0.36
MT2	3	6.38	21	1.12
MT3	4	8.50	30	0.45
PP	16	2.16	33	0.87
RB1	5	4.86	38	0.51
RB2	8	3.92	9	3.62

Source: Authors' calculations based on UN Comtrade data.
Note: HT1 = electronic and electrical products; HT2 = other high-technology products; LT1 = textiles, garments, and footwear; LT2 = other low-technology products; MT1 = automotive products; MT2 = process industry; MT3 = engineering products; PP = primary products; RB1 = agriculture-based products; RB2 = other resource-based products. Technology classification is based on Lall (2000).

Figure 2.11 Export Composition of Japan by Technology Class



Source: Authors' calculations using UN Comtrade data.

medium-tech exports in the 1980s and later by rising exports of high-tech products in the 1990s (see figure 2.12).

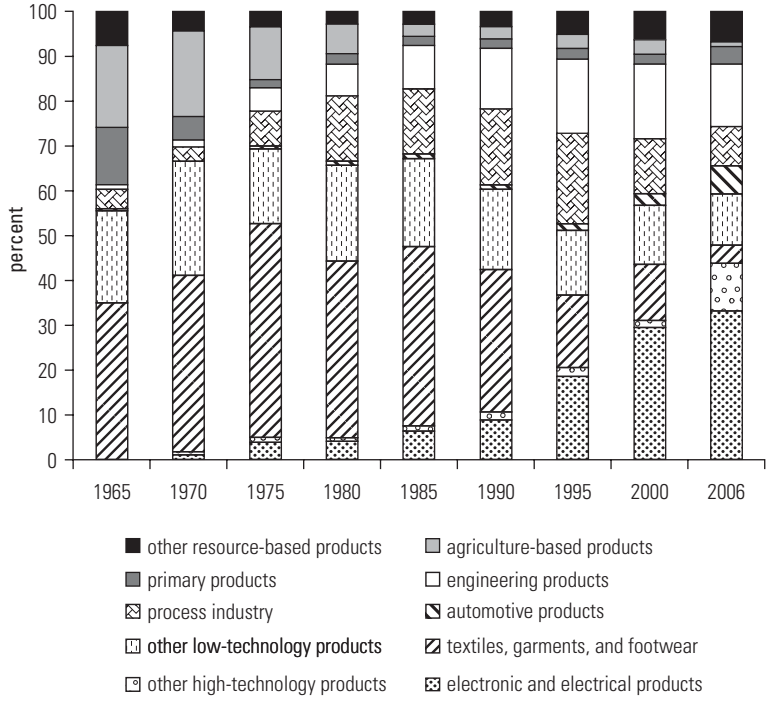
India's presence in the global manufactured exports market is limited mainly to low-tech (textiles, garments, and footwear) and resource-based products.

China's compelling production and export statistics are only one strand in the story of China's industrialization. Industrial capacity requires investment, and China has led the field in this regard. Furthermore, several complementary developments have made it possible to translate raw industrial capacity into the capability that has catapulted China into the front ranks of industrial economies. These developments include urbanization and the organizational skills forged by the Communist Party.

The Urban Focus of Industry

Industrial development is primarily an urban phenomenon. China's rural industry supported industrial change during the 1980s and early 1990s, but much of the action was in China's cities. On the eve of China's big industrial push in 1980, the

Figure 2.12 Export Composition of the Republic of Korea by Technology Class



Source: Authors' calculations using UN Comtrade data.

Table 2.12 Industry's Contribution to GDP Growth in Four Chinese Cities
percent

		Contribution to GDP Growth			
	Share of industry in GDP	Primary	Secondary	of which industry	Tertiary
Chongqing	38.1	8.0	51.1	43.0	41.0
Guangzhou	39.5	1.8	39.2	—	59.0
Shanghai	43.5	0.3	46.9	44.9	52.7
Tianjin	52.7	1.0	61.7	57.3	37.2

Source: National Statistical Bureau of China 2008.
Note: — = not available.

rate of urbanization was a mere 29 percent.[12] The Bureau of Statistics counted 189 cities in 1978. Urbanization began accelerating in the mid-1980s, pushing the urban share of the population to 42 percent; as of 2007, China counted 651 cities.[13] The notable feature of the vast majority of China's cities, with the exception of Beijing and a few others, is that they are primarily industrial cities. Manufacturing is prominent in each one, accounting for between one-third and one-half of GDP. Even in megacities such as Shanghai, Tianjin, Guangzhou, and Chongqing, manufacturing is the engine of growth. Tianjin derives more than half of its growth from industry (see table 2.12). Other, smaller cities also depend upon industry for much of their growth.

Cities have contributed to growth through scale and urbanization economies. Urban industrial development has mediated the transfer of workers from low-value-added jobs in rural areas to higher-value-added jobs in urban manufacturing activities. By consciously tying their own growth and prosperity to manufacturing, Chinese cities made it possible for the country to build a vast industrial base in a matter of years and to realize large gains in productivity. In most developing countries, the absence of such a focus has meant that industrialization has flagged, technological spillovers have been meager, fewer productive jobs have been created, the export potential has not been fully tapped, and income growth has fallen far short of objectives.

Cities in China have promoted industrialization by encouraging investment and entrepreneurship, but it is not the urban business environment in China that has been responsible for the pace of industrialization. According to the World Bank's *Doing Business Surveys*, China ranked 89th in 2009, far behind Malaysia and Korea, with the obstacles to starting a business and the difficulties in obtaining

[12]For economic and ideological reasons, the Chinese authorities tightly controlled urbanization prior to the 1980s. See Yusuf and Wu (1997, pp. 38-42).

[13]See Yusuf (2009). If the migrant population is included in the total, the urbanization rate in 2008 was approximately 50 percent, or 650 million people in all.

necessary construction permits and licenses identified as the principal weaknesses. China has promoted industrial change through a multitude of fiscal and price incentives, combined with heavy investment in urban infrastructure financed through the leasing of land, and by borrowing from banks.[14] By providing serviced land (industrial and technology parks are a favored vehicle for attracting industry) and sinking resources into energy, transport, water, and housing, as well as into other urban amenities and services, urban centers in China created the conditions in which industry could flourish. The availability of a literate, trainable workforce has also proven to be a considerable asset. Furthermore, a generation of public officials who firmly believe in the desirability of industrializing (and whose careers depend primarily upon economic outcomes) have spared no effort in trying to make China's cities industrial success stories.[15] The leadership and drive of municipal officials and their focus on a few economic objectives has been vital in translating policies into actions.

With encouragement from the government, state-owned banks have channeled China's abundant savings (not all of it, of course, but a substantial part) into developing cities and augmenting manufacturing capacity. The efforts aimed at neutralizing the effects of the 2008–09 global crisis vastly increased the scale of bank lending for these purposes. Thus, industrialization in China has been synonymous with urbanization; together these forces have stimulated a growth spiral and are responsible for many of the gains in productivity referred to previously.

The urban axes of China's industrialization have been given insufficient attention; these were and are the foci of an industrial system and the determinants of its dynamism. Urban centers of all sizes have been at the forefront of the efforts to forge a labor force suited to the needs of industry. China's investment in basic education provided the foundations for an industrial workforce. The ongoing highly ambitious efforts to upgrade the quality of human capital are being spearheaded by urban investment in secondary and tertiary education, vocational training,[16] and R&D. The great surge in the flow of human capital that began in the 1980s—first at the level of secondary education, then a decade later in tertiary education (see table 2.13)—was concentrated in the cities and paced by the rapid expansion in manufacturing activities. These activities generated revenues for public services, created jobs, and gave rise to the demand for an upgrading of skills.

In chapter 4 we will have more to say about R&D and tertiary education; here, it suffices to note that Chinese cities were quick to respond to government signals

[14]This is viewed as the fiscal Achilles heel of many municipalities, and fiscal sustainability will be a challenge for many in the years ahead.

[15]At times, this has come at the cost of environmental objectives.

[16]Inland cities are giving greater emphasis to vocational training in an effort to attract more industry from coastal areas where cost pressures are rising.

Table 2.13 Gross School Enrollment, China
percent

Share of total population	1985	1990	1995	2001	2007
Primary	120.4	127.5	116.9	117.4	112.3
Secondary	31.3	37.7	50.9	65.0	77.3
Tertiary	—	—	—	9.9	22.9

Source: World Development Indicators Database.
Note: — = not available.

to ramp up their education systems so that industry would not be constrained by a lack of skills. Moreover, the vital tertiary-level skills, which are buttressing China's transition to more sophisticated manufactures and services, are the result of efforts by municipalities to build local innovation systems adequate for the challenges posed by a 21st-century global environment.

Organizational Capacity

China's urban environment was especially conducive to industrialization for one additional reason: the presence of organizational skills. Although China's original industrial template was borrowed from the Soviet Union, over time it was significantly modified. With the adoption of the Third Front program, a highly dispersed yet centrally directed approach to development, industrialization was fostered throughout the country (Naughton 1988). What was earlier described as a "cellular" economic model embedded industrial (and technological) capabilities in many parts of China, some of which had been unsuited for the development of industry (Donnithorne 1967). The upshot of this approach, reinforced by the scale and organizational efficacy of the Communist Party, was threefold. First, a large number of production units were created, many of them vertically integrated out of necessity because suppliers were unreliable, the transport system was backward, and the logistics capacity was primitive. Second, industrial breadth was cultivated within provinces (and often within municipalities), a strategy that endowed virtually every part of the country with an industrial base—one, in many respects, quite uniform in composition. This is apparent from tables 2.14 and 2.15, comparing three advanced coastal provinces with three of the least developed interior provinces in terms of industrial composition. Larger industrial enterprises tended to be highly self-contained, catering to most of their essential requirements, because internal trade was hindered by local mercantilism and a multiplicity of barriers to trade, and the services sector was severely underdeveloped. Vestiges of this are still apparent in the numerous auto assembly plants, steel and cement mills, engineering firms, and producers of chemicals and fertilizers of suboptimal size scattered throughout China. Many of the state enterprises and collectives continue to provide employees with a multiplicity of services, although these are being cut back.

Table 2.14 Gross Regional Product by Three Strata of Industry, China, 2008
percent

Region	Composition (GRP = 100)				
	Primary industry	Secondary industry	Industry	Construction	Tertiary industry
Interior provinces					
Henan	14.4	56.9	51.8	5.6	28.6
Hunan	18.0	44.2	38.3	6.7	37.8
Sichuan	18.9	46.3	39.4	8.2	34.8
Coastal provinces					
Jiangsu	6.9	55.0	49.7	5.8	38.1
Zhejiang	5.1	53.9	48.2	6.4	41.0

Source: National Statistical Bureau of China 2009.

Table 2.15 Share of Total Industrial Output Value by Type of Enterprise, China, 2008
percent

Region	Enterprises of light industry	Enterprises of heavy industry
Interior provinces		
Henan	31	69
Hunan	28	72
Sichuan	32	68
Coastal provinces		
Guangdong	38	62
Jiangsu	27	73
Zhejiang	41	59

Source: National Statistical Bureau of China 2009.

The third outcome of dispersed cellular development orchestrated by the Communist Party was the necessary inculcating of organizational capabilities for managing production, adapting technologies, creating a provincial (or national) supply chain and distribution system (however rudimentary), and improvising solutions as the need arose.[17] This organizational capital—formal and informal via connections—and the induced entrepreneurship has, in hindsight, proven a

[17]Bloom and Van Reenen (2010) point out that the role of management in raising productivity and managerial and organizational skills—plus investment in information and communication tehnology (ICT)—also seem to explain the productivity advantage of the United States over Europe (Gordon 2003). Although much doubt has been cast on the quality of management in Chinese state-owned enterprises (SOEs) and collectively owned enterprises (COEs) their achievement to date in absorbing technology and raising productivity suggests that factory management skills might not be meager after all.

considerable asset. Localized autonomy seemingly coexisted with a disciplined responsiveness to directions from the leadership in Beijing.

China had access to resources few developing countries could muster as a result of the scale, geographical distribution, and scope of production capabilities (however primitive); the accumulated local organizational skills; and the relays built into the command system. The party organization and its penetration made it possible to mobilize resources on a scale unimaginable in other countries. Once the leadership committed to a strategy, it was possible, with the help of incentives and sanctions stiffened by party discipline, to pursue countrywide development programs and achieve certain narrow objectives in short order. In other words, the organization building and state-directed industrialization that preceded the reform era made it possible for the central authorities to launch, finance, and largely implement an industrial Big Push involving thousands of counties and municipalities.

Other countries have created organizations with comparable heft, but none has succeeded in imbuing them with an enduring discipline and the flexibility to form a vast, decentralized industrial program. This is not to imply that the organization was without flaws, or that China has not had to wrestle with slippages and problems of accountability, corruption,[18] and other ill effects arising from the undue exploitation of discretionary power. There have been these problems and others. The organizational relays are not flawless, and signal distortion and misinterpretation have been recurring (albeit still manageable) phenomena. The unerring ability to meet targets determined by the government has frequently led to questions over the accuracy of statistics used to establish programs. However, the broad and very tangible achievements are reliable testimonials. In the late 1970s China was in dire economic straits. After a decade of political strife and social upheaval, it lagged far behind Japan and Korea. In economic terms it was tiny, with just 1.8 percent of global GDP (at nominal exchange rates), and devoid of internationally competitive industrial assets. But unlike the Soviet Union, the untidy socioeconomic structures that had congealed over almost three difficult—and occasionally strife-torn—decades had huge latent potential, which reform was able to release. By steadily increasing doses of market incentives, the government channeled the entrepreneurial energies released into public sector–led development using organizational skills, leavened by ideology that was periodically reoriented as circumstances and objectives changed. Table 2.16 shows that China's real industrial output has grown at a consistently high rate since 1978, with a peak average annual growth rate of 15 percent during 1993–97. The other determinants of industrialization described in this chapter all played their part; however, the piecemeal adoption of market institutions alone could not have

[18]On China's struggle to cope with corruption, see Pei (2008) and Manion (2004); and with regard to organizational crime, see "China's Other Face" (2009).

Table 2.16 Industrial Output Growth: China, 1978–2008

Period	Average real increase in added value of industrial output (%)
1978–82	9.1
1983–87	13.1
1988–92	11.9
1993–97	15.4
1998–2002	9.2
2003–08	13.1

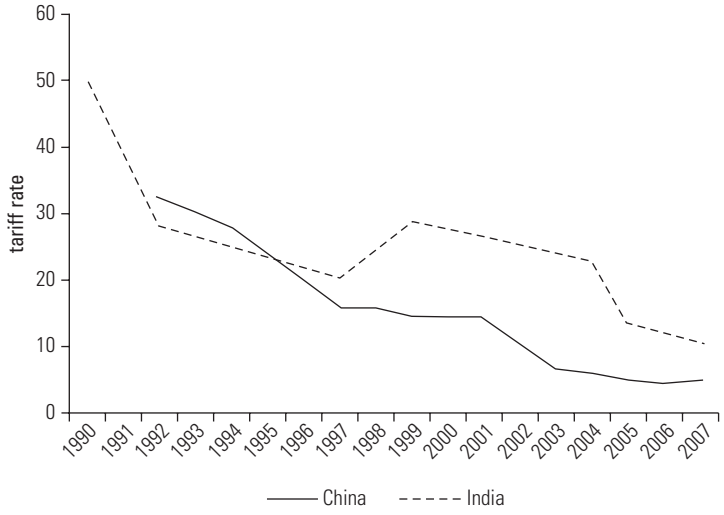
Source: Chinability.com 2009; World Bank 2009.

produced such dramatic industrial outcomes. In the 1980s and the 1990s, economic science offered no clear recipes for transitioning economies or for how transition might be combined with growth. Transitioning countries had to learn by doing. In hindsight, China—which eschewed a Big Bang deconstruction of the socialist system—emerges as the most adept learner. The Chinese state and its organizational apparatus directed, coordinated, organized, and incentivized. It also selectively harnessed market forces, pragmatically adjusting its ideological bearings to meet economic objectives. Now, as China's industrial development enters a new phase in a global environment that could be on the cusp of major changes, the virtues of this approach will be severely tested.

India's Development Experience

India's growth gained speed in the early 1980s, after a dribble of reforms had dismantled some of the regulations that had shackled the economy since the period soon after independence; but the economy did not begin a virtuous spiral led by industry (and supported in due course by exports), as happened in China. The Indian economy muddled along without the benefit of a well-articulated development strategy that was consistently and forcefully pursued by each succeeding government. The tempo of deregulation and the reduction of tariffs (figure 2.13) picked up in the early 1990s, following a severe macroeconomic crisis fed by public sector deficits and exacerbated by the Gulf War, which forced India to seek the assistance of an International Monetary Fund program (Panagariya 2008). However, the catalytic event that significantly improved India's economic fortunes and grouped it with China as one of Asia's emerging giants was the unanticipated success of business process outsourcing (BPO) activities and information technology–enabled services (ITES), initially concentrated in Bangalore but spreading later to Hyderabad, Chennai, the suburbs of Mumbai and Delhi, and recently to

Figure 2.13 Average Tariff Rates, China and India



Source: UNCTAD TRAINS database.

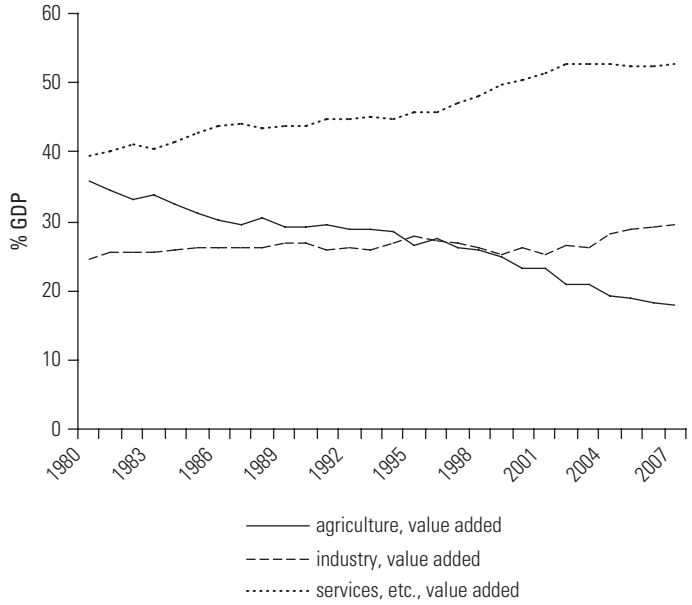
Kolkata. Since 2000, India's growth has quickened and the share of manufacturing has edged upward; but how closely India's future industrialization will approximate China's in terms of pace and scale is far from obvious. A look backward can provide a perspective on India's industrial dynamic and how the country is positioned vis-à-vis China.

India's planners, much like their counterparts in China, adopted an import-substituting industrial strategy which favored heavy industry—preferably under state control[19]—when the country embarked on its first five-year plan in 1955 (Kochhar and others 2006). But they also were highly protective of small-scale rural (and urban) cottage-industry production of textiles, garments, household products, farm implements, and other items.[20] Strict licensing of formal and larger-scale industrial activities, a highly protective trade regime, regulations inhibiting the growth of firms, the acquisition of land for industrial purposes, and the laying off of workers by larger firms all discouraged industrial development

[19]There were frequent references in planning documents to the desirability of the state maintaining its grip on the "commanding heights of the economy," meaning the producers of ferrous metals and capital equipment.

[20]India was the world's largest exporter of cotton cloth in 1950. But after Nehru reoriented production toward the domestic market, Japan quickly displaced India as the leading exporter.

Figure 2.14 Composition of GDP (Supply Side), India



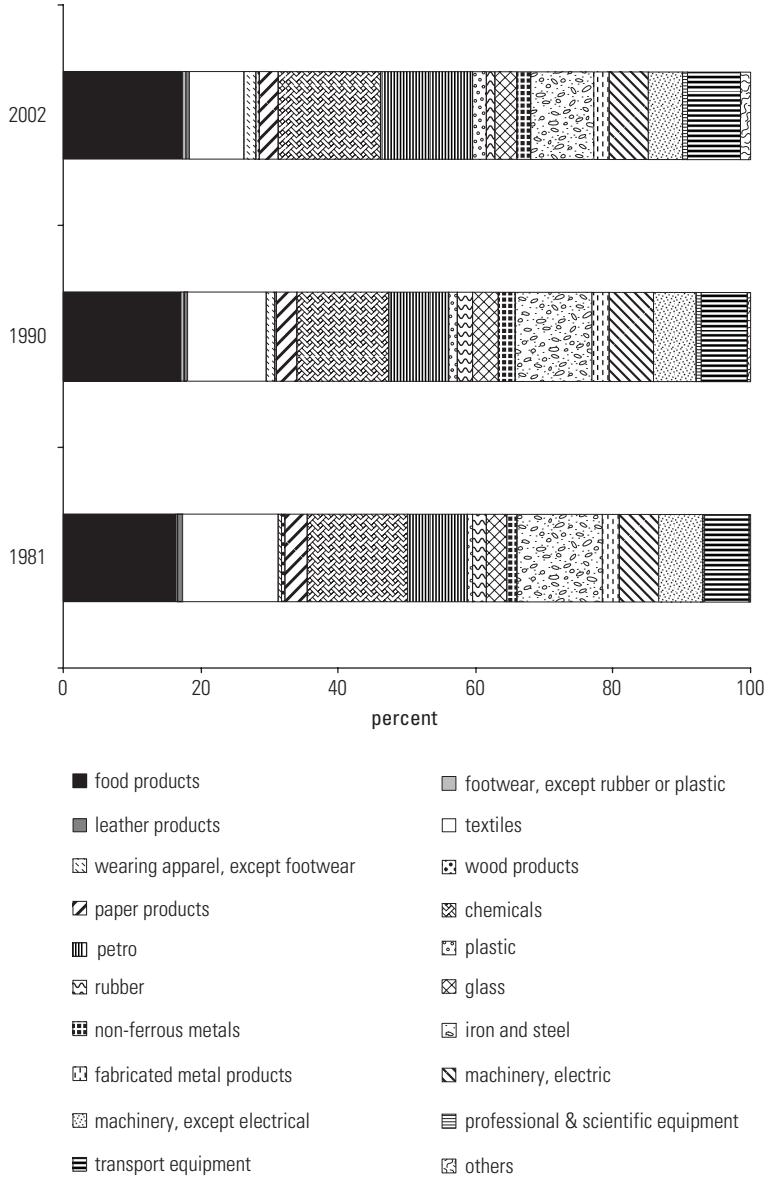
Source: World Development Indicators Database.

(see figure 2.13). A burgeoning state apparatus seemingly devoid of development ambition tightened its suffocating grip on the industrial economy, drowning India in a sea of red tape that came to be known as the "License Raj."[21]

In China, the reform and opening of the economy, starting in 1978, signaled a decisive break from the past. The limited and tentative pro-business reform efforts[22] by the Indian government in the 1980s were by no means as decisive; as a result, India sacrificed a decade or more of growth. India's fractious democratic process, keyed to the interests and frequently conflicting demands of many communities, could not readily focus on a single overarching development objective. The tenacious, process-oriented bureaucracy could not be motivated to adopt a regulatory stance consistent with the rapid growth of industry. The economy grew faster, but it did not enter a period of decisive structural change. The impression emerges of slow change lacking an industrial imperative, as is apparent in figure 2.14 on sectoral shares, and reinforced by movement in the shares of manufacturing subsectors between 1981 and 2002 (see figure 2.15). Food products gained, as did chemicals, petrochemicals, and

[21]On the reach and tenacity of the "License Raj," see Luce (2007) and Khanna (2007).
[22]See Rodrik and Subramanian (2004).

Figure 2.15 Industrial Composition by Type of Manufactures of India, 1981, 1990, and 2002



Source: UNIDO INDSTAT3.

transport. Subsectors that lost ground were textiles, iron, and steel. Unlike the situation in China, the changes were modest; and there was no clear trend toward technology-intensive products.

During India's phase of slow growth, from 1960 to 1980, output grew by 3.4 percent per year, with physical capital contributing 1 percent per year and TFP just 0.2 percent. Between 1980 and 2004, the pace of GDP growth rose to 5.8 percent, with capital contributing 1.4 percent and TFP 2.0 percent (see table 2.17). Strikingly, in the earlier period, industry and manufacturing grew at 4.7 and 4.6 percent, respectively; manufacturing TFP rose 0.2 percent, and that of industry as a whole actually declined by 0.4 percent. The performance improved only a little in the high-growth era from 1980 through 2004. Growth was 2 percentage points higher, but manufacturing TFP rose only by 1.5 percent and that of industry as a whole by 1 percent.

The picture is almost unchanged during 1999–2004 for industrial growth and growth of manufacturing, except that the increase in TFP slowed fractionally. From 2004 through 2008, manufacturing output rose faster than in the first half of the decade and made the largest contribution to the growth of GDP (16 percent, as shown in figure 2.16). However, the contribution of TFP dropped to 1.4 percent in 2007–08 (Virmani 2009).

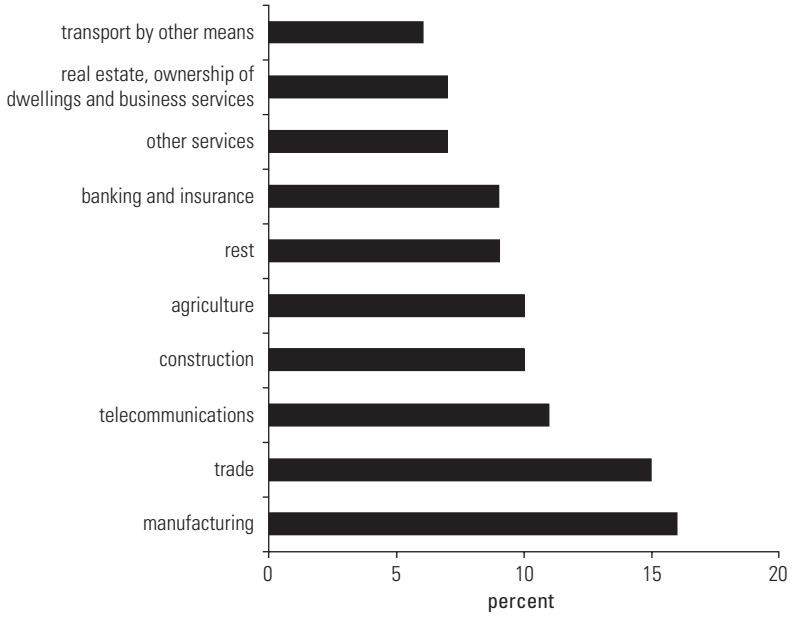
The indicators of labor productivity and value added for industry point to improvement; but overall, the gains are modest, generally less than the gains achieved by China. Figure 2.17 shows that output per worker had a gentle upward slope starting in the mid-1980s, but this began to flatten out 10 years later, with

Table 2.17 Sources of Economic Growth: Total Economy, India, 1960–2005
annual rate of change (%)

				Contribution of			
Period	**Output**	**Employment**	**Output per worker**	**Physical capital**	**Land**	**Education**	**Factor productivity**
Total economy							
1960–2004	4.7	2.0	2.6	1.2	–0.1	0.3	1.2
1960–80	3.4	2.2	1.3	1.0	–0.2	0.2	0.2
1980–2004	5.8	1.9	3.8	1.4	0.0	0.4	2.0
Selected subperiods							
1960–73	3.3	2.0	1.3	1.1	–0.2	0.1	0.2
1973–83	4.2	2.4	1.8	0.9	–0.2	0.3	0.6
1983–93	5.0	2.1	2.9	0.9	–0.1	0.3	1.7
1993–99	7.0	1.2	5.8	2.4	–0.1	0.4	2.8
1999–2004	6.0	2.4	3.6	1.2	0.1	0.4	2.0

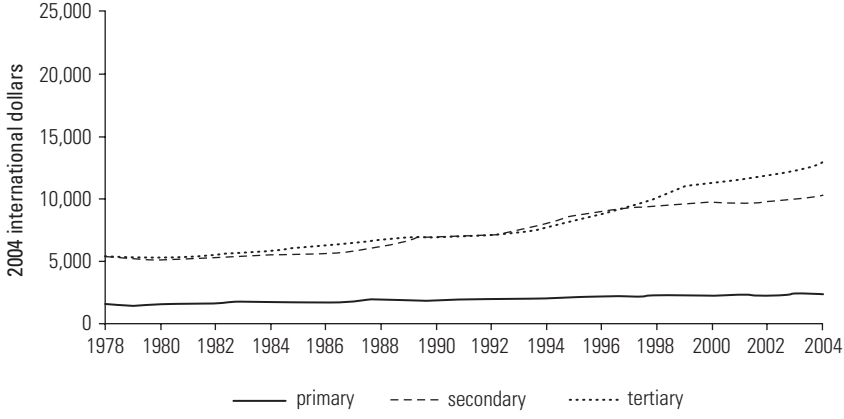
Source: Bosworth, Collins, and Virmani 2007.

Figure 2.16 Contribution of Leading Sectors to Growth, India, 2002–03 through 2007–08



Source: Virmani 2009.

Figure 2.17 Output per Worker by Sector, India, 1978–2004



Source: Bosworth and Collins 2007.

little increase from then onward. Value added in secondary industry was half the level in China in 1978. Fifteen years later, in 1993, it was only 4 percentage points higher. It remained unchanged through 2004, whereas value added in services went from 32 percent in 1978 to half of the total for the economy in 2004 (see table 2.6). The share of employment also rose faster in services. When sectoral output growth data are placed alongside the other indicators, it is apparent that—unlike the case for China—tertiary industry has performed better than secondary (including manufacturing) industry in India. In the high-growth period from 1993 through 2004, the contribution of output growth per worker was greater in services (2.1 percent) than in secondary industry (0.9 percent) (see table 2.7). This is in tune with extensive qualitative and empirical evidence highlighting the considerable strides made by the IT-based, financial, and business services in India since the mid-1990s, and it is mirrored in India's exports of goods and services. Between 1995 and 2004, exports of services increased annually by 21 percent, whereas those of goods increased at half that rate. As a consequence, the share of goods in India's total exports declined from 82 percent in 1995 to 67 percent in 2004 (see table 2.18).

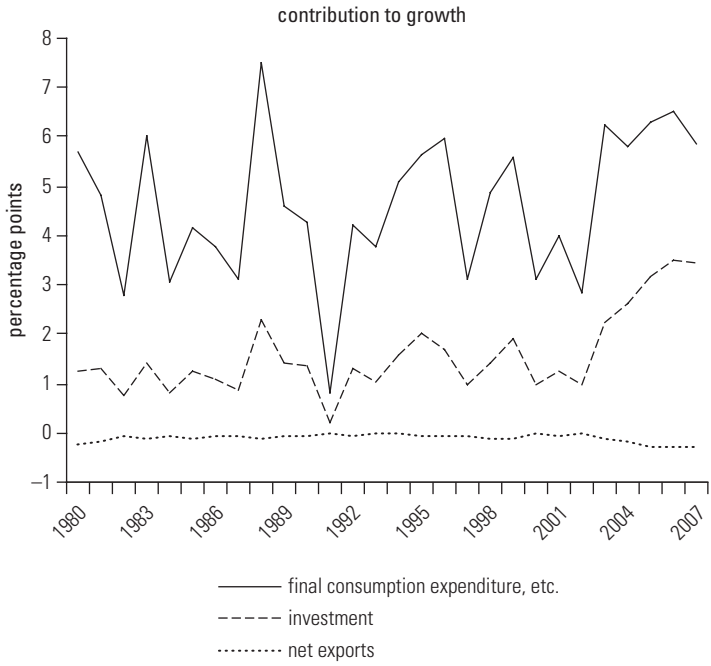
Given India's smaller size and moderate pace of growth, manufacturing and other industrial activities have had a lesser influence on its aggregate economic performance relative to China. Nevertheless, the contribution of industry has paralleled—and sometimes marginally exceeded—that of services. In 2007, it was higher than services by 0.6 percentage points. Whether this larger contribution is sustained will depend upon the changing weight and competitiveness of

Table 2.18 Annual Growth in Exports: China and India, 1995–2004
percent

	1995–2004	1995–2000	2000–04
China			
Total exports	18.1	13.7	23.8
Goods	18.6	14.2	24.2
Services	14.0	9.7	19.7
India			
Total exports	12.6	9.5	16.6
Goods	10.1	6.7	14.5
Services	20.6	19.8	21.6
	Memo: Share of goods in total exports		
	1995	**2000**	**2004**
China	87.0	89.1	90.5
India	82.2	72.2	67.1

Source: Bosworth and Collins 2007.

Figure 2.18 Contribution to Growth (Demand Side), India



Source: World Development Indicators Database.

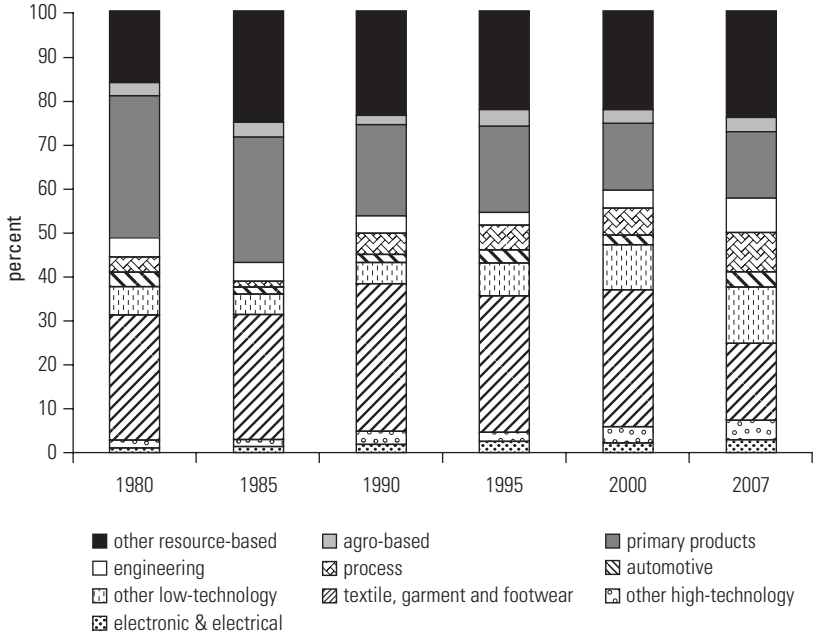
technology-intensive subsectors with robust market prospects. India's engineering, chemicals, pharmaceuticals, iron and steel, and automotive industries have nurtured world-class firms producing competitively priced, quality products.[23] However, these still account for a small part of GDP and of exports. India has yet to establish a significant presence in the export market and derives limited growth benefits from trade, although the negative stimulus provided by net exports indicated in figure 2.18 surely understates the role exports play.

India's Trade

Total exports of goods and services rose fourfold between 2000 and 2007 (in comparison, China's exports were in excess of five times larger), but the composition

[23]See the discussion of Indian companies by Roy (2005) and Chaze (2006). Kumar (2009) explains the success of India's leading firms such as Bharat Forge, Suzlon, Mahindra and Mahindra, and the Tata Group. Van Agtmael (2007) describes the emergence and growth of Indian firms such as Ranbaxy and Infosys. He also examines success stories from China; Taiwan, China; Mexico; and other emerging economies.

Figure 2.19 Export Composition of India by Technology Class



Source: Authors' calculations using UN Comtrade data.

of India's exports does not resemble that of an industrializing economy (see figure 2.19). In 1980, 51 percent of commodity exports consisted of primary products and agriculture- or resource-based products. Less than 14 percent were high-technology or engineering and automotive products. By 2007, the category of low-tech items accounted for 41 percent of exports, while the share of medium- and higher-tech products had risen to 27 percent. The share of textiles and garments had dropped from 29 percent to about 18 percent, but that of other low-tech items doubled from 6.5 percent to nearly 13 percent. As a share of world production, India's manufacturing activities are of significance in subsectors such as food products, textiles and apparel, leather products and footwear, (petro) chemicals, and, more recently, iron and steel. Even in these industries, India's share is a fraction of China's. In other industrial subsectors, India's production is a small—sometimes trivial—part of global production. Its share of global exports presents a comparable picture (see table 2.19).

Urban Development in India

Compared with China, which has been urbanizing at a rapid clip since 1980, India has lagged far behind; the urban population is less than one-third of the

Table 2.19 Global Share of Exports of Goods and Services
percent

Country	1980	1985	1990	1995	2000	2005	2007
China	0.86	1.31	1.56	2.61	3.50	6.44	7.71
India	0.49	0.53	0.52	0.61	0.76	1.24	1.44

Source: World Development Indicators Database.

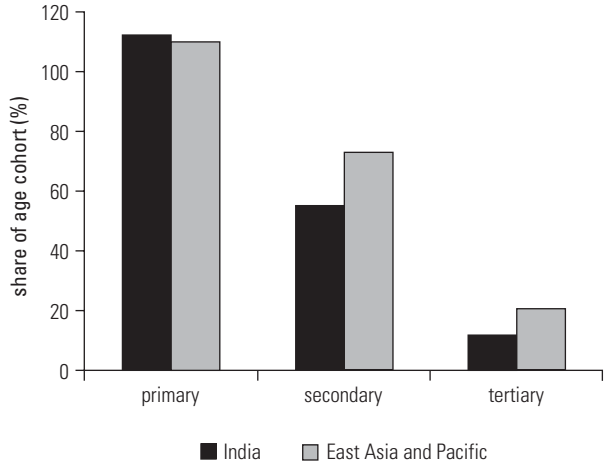
total.[24] Moreover, many of India's cities have been slow to reform a business environment that subjects industry to numerous obstructive rules and statutes. The country's labor laws and assertive unions discourage hiring because layoffs are problematic and can be expensive. Land use and the real estate market in general are highly inefficient. Acquiring a large block of land composed of contiguous parcels for industry or infrastructure is a major challenge. Even a single landowner can hold a major deal hostage ("India: Land Acquisition" 2009). An amalgam of laws and ownership disputes are to blame, and the Land Acquisition Act and the overburdened courts have persistently failed to penetrate the inherited morass of problems that hobble every city. Limited access to land interferes with the entry of new firms and the growth of existing ones. In short, Indian cities have not made haste to embrace industrialization, seek agglomeration and urbanization economies, or actively pursue industrial clusters. The partial exceptions are cities such as Bangalore and Hyderabad, which have (rather haphazardly) gone about creating IT parks in response to the demands of the business community.

Urban industrialization is further hamstrung by India's notoriously inadequate physical infrastructure, a legacy of insufficient investment, and poor or nonexistent urban planning. Energy shortages and transport bottlenecks have severely curtailed industrial development in strategic urban locations. Even the iconic city of Bangalore has struggled to build the infrastructure it urgently needs, and its traffic jams remain the stuff of legend.[25] In addition, housing shortages and the ramshackle water and sanitation facilities are a brake on urban development. The infrastructure deficit in major Indian cities is vast; reducing this deficit while accommodating the anticipated growth in urban populations poses an enormous challenge for city administrators and will absorb a huge volume of resources. Moreover, the payoff from this investment will depend upon price and

[24]Nevertheless, the urban sector accounts for 60 percent of GDP ("India: Urban Development," 2010).

[25]It took years to expand the city's airport and put it on par with international standards. Unfortunately, its location relative to the economic hub makes it highly inconvenient for the business traveler.

Figure 2.20 Gross School Enrollment, 2006



Source: World Development Indicators Database.

regulatory reforms that reduce the risks for investors and combat dysfunctional legacies. Farsighted planning in the areas of land use and public transport is also needed to build compact and resilient cities with smaller carbon footprints. India and China need to anticipate and accommodate global warming concerns and resource constraints as they urbanize. With so much urbanization ahead, both countries have an opportunity to avoid costly mistakes and maximize the gains from urban development.

The urban development gap in India coexists with a human capital gap. The problem arises from a shortage of tertiary-level and technical skills and from the overall low quantity (and quality) of basic and secondary education. Once again, underinvestment in tertiary education and vocational training to increase the number of schools and enhance the quality of instruction are to blame. Furthermore, unlike the case in East Asian countries, enrollment rates in primary and secondary education in India are low, constraining India's efforts to rapidly ramp up human capital formation in post-secondary and tertiary education (see figure 2.20). Manufacturing competes for talented engineers and other knowledge workers with software, IT, and consulting firms,[26] which are able to offer more attractive salaries. India's financial sector has also enticed away some of the most able graduates; this is commonplace in industrialized countries but probably not advantageous at India's current stage of industrial development.

[26]Overseas migration of knowledge workers further drains the pool of candidates with high-level skills.

As a result of these institutional, infrastructure, urban, and skill constraints, India's manufacturing sector, which could have been a star performer and the driver of growth, has underperformed over the past decade and accounts for too small a share of GDP and of exports. In particular, the inadequacy of the electronics and electrical engineering industries, which have aided growth elsewhere in East Asia, is conspicuous.

The Role of FDI

The very same factors that have restrained manufacturing overall have also, until recently, discouraged FDI in Indian manufacturing,[27] whereas weak export incentives[28] may account for the absence of dominant homegrown electronics firms comparable to Samsung and LG in Korea, another country that shunned FDI.

Both China and India attracted small amounts of FDI in 1980. But whereas FDI in Chinese industry—in particular, the manufacturing industry—began rising sharply in the 1990s, FDI in India began climbing only after 2000, with just a small percentage initially finding its way into manufacturing.[29] As recently as 2007, FDI in China was $138.4 billion; in India, it was $23 billion. Chinese producers of a wide range of tradables (many of which are joint ventures or subsidiaries of foreign companies) are now among the main suppliers, if not the largest suppliers, to international production networks. Indian manufacturers, other than for textiles, garments, and leather goods, are only now gaining a significant foothold in industries such as auto parts.

Relative to China, India is at an earlier stage of industrialization, even though some Indian firms are manufacturing state-of-the-art products using the most advanced technologies. India is only the world's 16th largest exporter; manufactures constitute only 40 percent of its exports, which puts it a long distance behind China. India has thus far made little difference, if any, in the industrial geography of Asia. It is a tiger that has been slumbering. Many believe that the tiger is now awake, that it can grow at nearly double-digit rates, and that its future industrialization will have major consequences for other countries. In the meantime, China has a lead of almost two decades, and its industrial and trading presence is widely felt.[30] In the following chapter, we will examine the industrial strengths of the two countries and how these could affect others.

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[27]Until recently, government policy toward FDI by multinational corporations remained relatively cool.

[28]Including incentives provided by exchange rate policies.

[29]Wenhui Wei (2005) ascribes the differences in flows of FDI to China and India to a number of factors. China's great attraction has been the size of its domestic market and the strength of its trading links with the United States and the EU. India, by comparison, has somewhat lower labor costs, lower country risks, and greater cultural affinity with some of the investing countries.

[30]China is now India's foremost trading partner.

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